CLIMECON®

ECO SERIES

Individually adjustable forced air heaters
for each room – the best solution
for low-energy and passive houses

06.16

ECO

The silent ECO series forced-air heaters work by heating preheated air based on the requirements of each room individually. Heating is controlled by accurate PI control ensuring high thermal comfort. The intelligent system reacts quickly to temperature changes and keeps the room temperature precisely at the desired level.

One of the features of the ECO series is accurate heating adjustment for each room separately. Because heating takes place in the room as needed, ECO products involve minimal heat losses in the air ducts. The ECO series is the perfect choice for optimal energy efficiency, simplicity and clarity in heating adjustment and high thermal comfort in every room.

A passive house requires the right type of heating

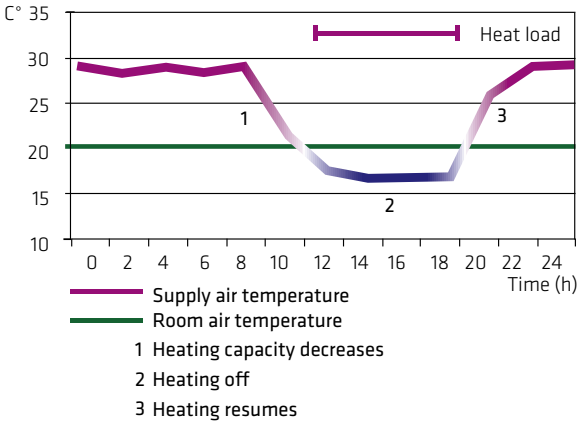
Building technology design for passive houses starts from minimising the need for heating and cooling. At best, the energy requirement for heating a passive house is no more than 20–30 kWh per gross square metre and 10–20 W per square metre for the rooms. These figures correspond with the definition of a passive house by the Technical Research Centre of Finland.

The low overall heating power consumption requires that the heating system also works at low power and, most importantly, that it reacts quickly to changes. Room temperatures must be individually controllable to achieve high energy efficiency and thermal comfort.

Your best choice: individual forced-air heating for each room

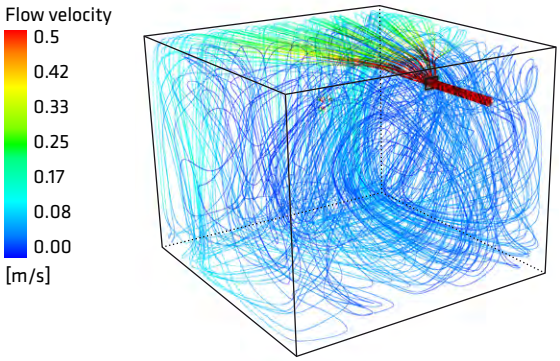
The best heating method for a passive house is forced-air heating.

When heating rooms individually, air flows do not need to be changed as heating needs vary because the supply air temperature will be automatically regulated according to the heating needs of each room.



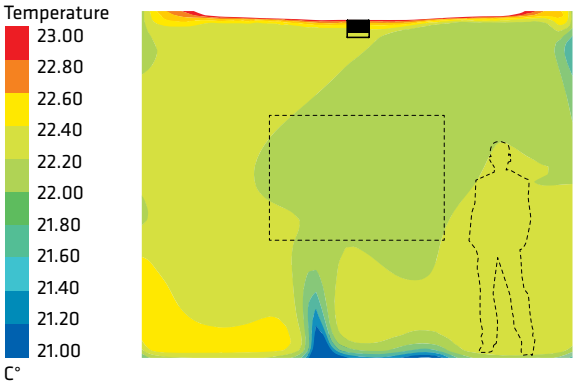
The graph shows the drop in supply air temperature with an additional heat load in the room, such as heat from the sun, fireplace or people. Supply air temperature drops below room temperature to compensate for the additional heat load and maintain a constant room temperature.

Flow velocity



ECO forced-air heaters achieve an even, draught-free air distribution in the entire room, thanks to their high mixing ratio.

Temperature

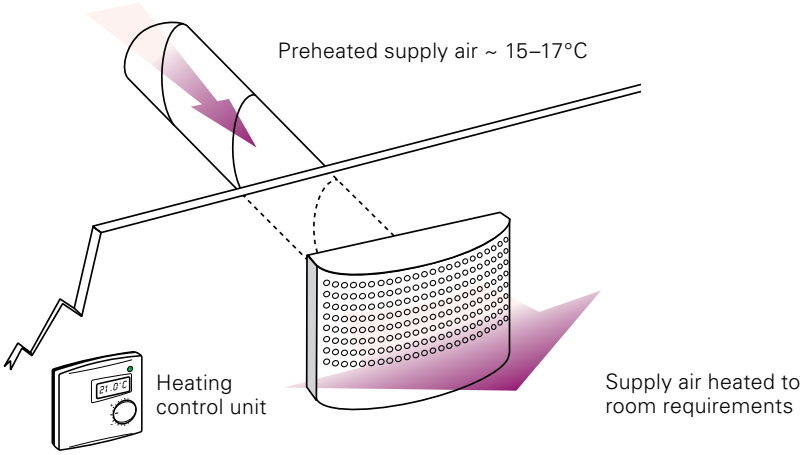


The temperature distribution within the entire room space is extremely even in passive houses and its rooms heated with ECO forced-air heaters. The cooler area at the front of the graph was caused by cooler air through the window.

With the structures and materials specially designed for passive houses and built carefully, even air supplied from above close to the ceiling will be distributed evenly throughout the room.

Silent, energy-efficient heat

The silently operating ECO forced-air heaters work by heating air that is approximately 15–17°C based on the requirements of each room individually.



Precise adjustment for best comfort

Heating is controlled by accurate PI control ensuring high thermal comfort. The higher the deviation from the preset value, the higher the heating power. When the room temperature is close to the preset value, the unit works at lower power.

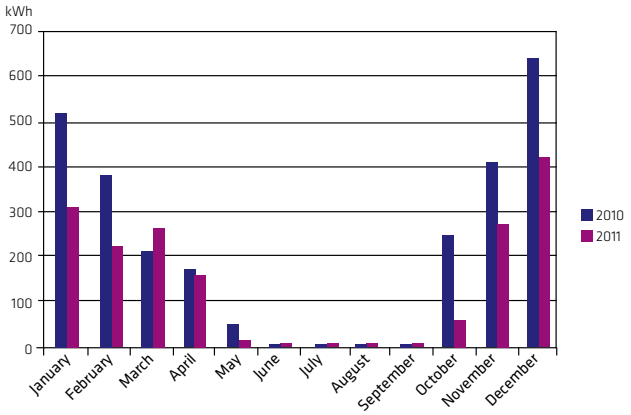
The control unit that houses the room temperature sensor has no heat-emitting components. This achieves a very accurate measurement of room temperature.

The intelligent system reacts quickly to temperature changes and keeps the room temperature precisely at the desired level.

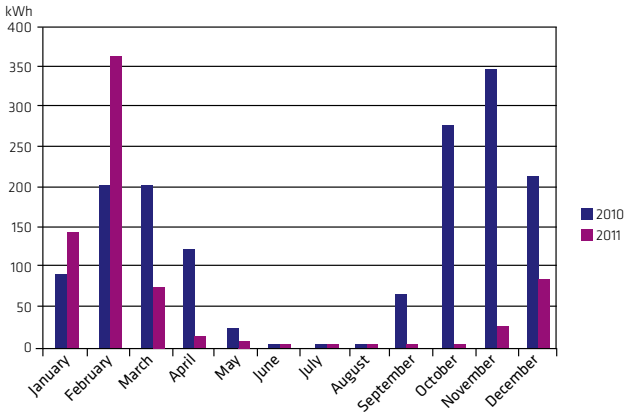
Comfortable heat with low energy consumption

The ECO system switches on for extremely short, precisely defined cycles, keeping the surface temperature of the heating element as low as possible. The low surface temperature, due to the large surface area of the element, does not burn dust.

The heating energy consumption of ECO forced-air heater in two similar 186-m² passive houses in the Helsinki, Finland, region in 2010 and 2011(*



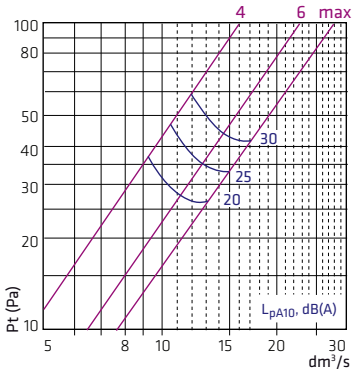
House A: ECO forced-air heaters are the only principal heat sources besides a fireplace.
Note! In 2011, the targeted air flow and heating adjustments were achieved and heating energy consumption lowered.



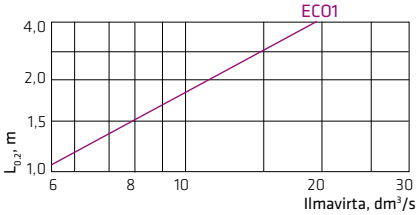
House B: Heated through a combination of an air-source heat pump and ECO forced-air heaters. Winter 2011 included a period when people were not present in the house and the floor heating, for example, was minimised. This is reflected as a peak in the energy consumption of the ECO heaters.

*)Consumption figures valid only for these example houses.

ECO 1, wall mounting

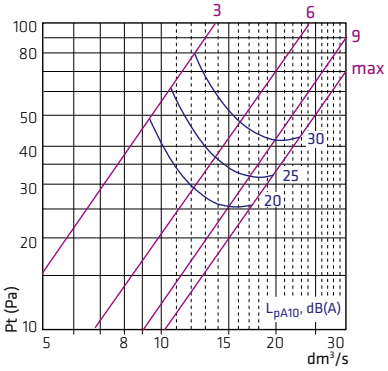


Device fully open, top edge 10 mm from ceiling

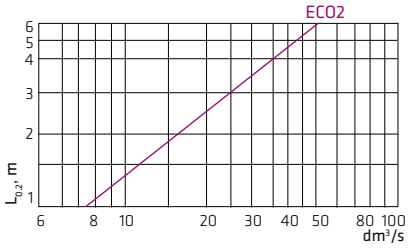


Change in supply air temperature does not affect throw length. Width of throw pattern increases. See page 6.

ECO 2, wall mounting

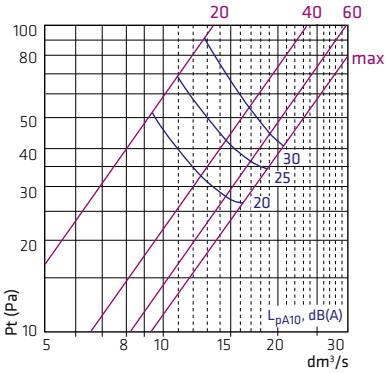


Device fully open, top edge 100 mm from ceiling

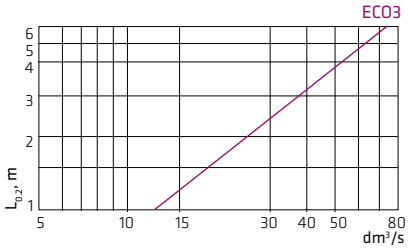


Change in supply air temperature does not affect throw length. Width of throw pattern increases. See page 6.

ECO 3, ceiling mounting

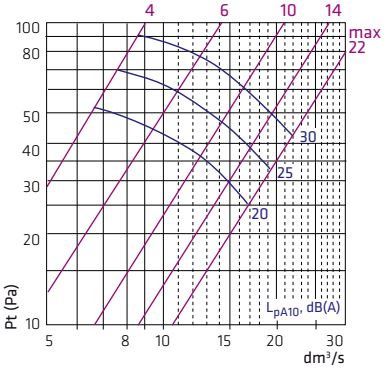


Device fully open

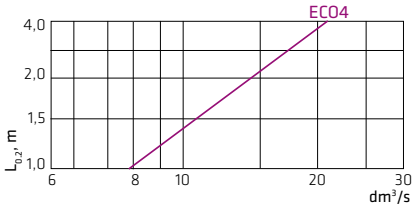


Change in supply air temperature does not affect throw length.

ECO 4, wall mounting



Device fully open, top edge 10 mm from ceiling

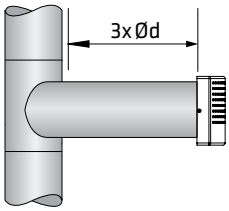


Change in supply air temperature does not affect throw length.

ECO control unit

Sound level increase

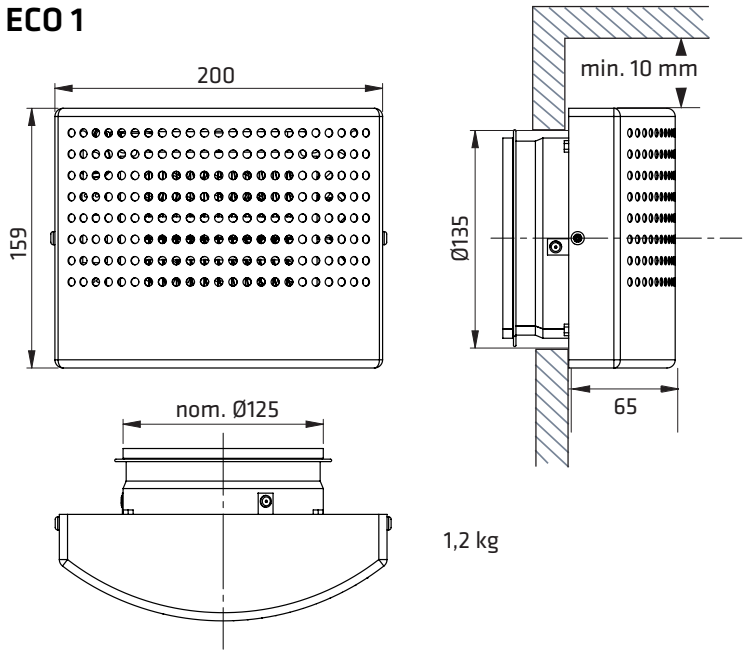
Sound level will increase if cover distance is below 3xØd:
- after bend +4 dB (A)
- after T joint +8 dB (A)



$L_{wokt} = L_{pA10} + K$									
	f, Hz	63	125	250	500	1k	2k	4k	8k
ECO1	K, dB	0	-4	-1	2	0	-4	-17	-11
ECO2	K, dB	-10	-7	-3	1	1	-6	-15	-11
ECO3	K, dB	-1	-4	-1	1	0	-4	-13	-16
ECO4	K, dB	-8	-6	-5	-1	0	-5	-10	-11
ΔL (dB)									
	f, Hz	63	125	250	500	1k	2k	4k	8k
ECO1	ΔL, dB	21	14	9	4	2	4	5	6
ECO2	ΔL, dB	21	14	9	3	2	4	4	5
ECO3	ΔL, dB	20	14	9	5	2	4	6	7
ECO4	ΔL, dB	20	14	8	2	1	4	4	5

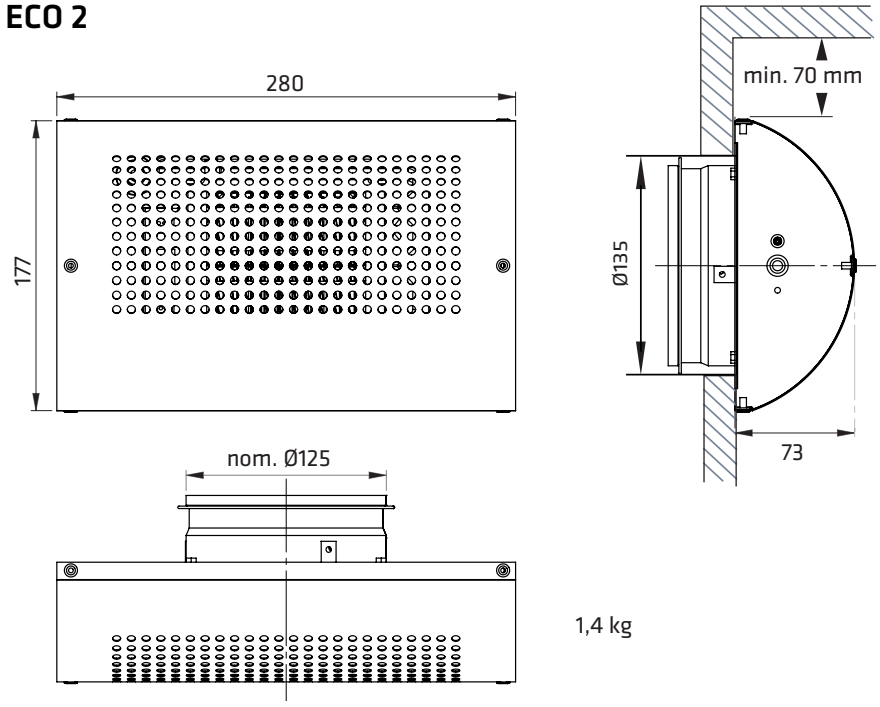
Dimensions

ECO 1



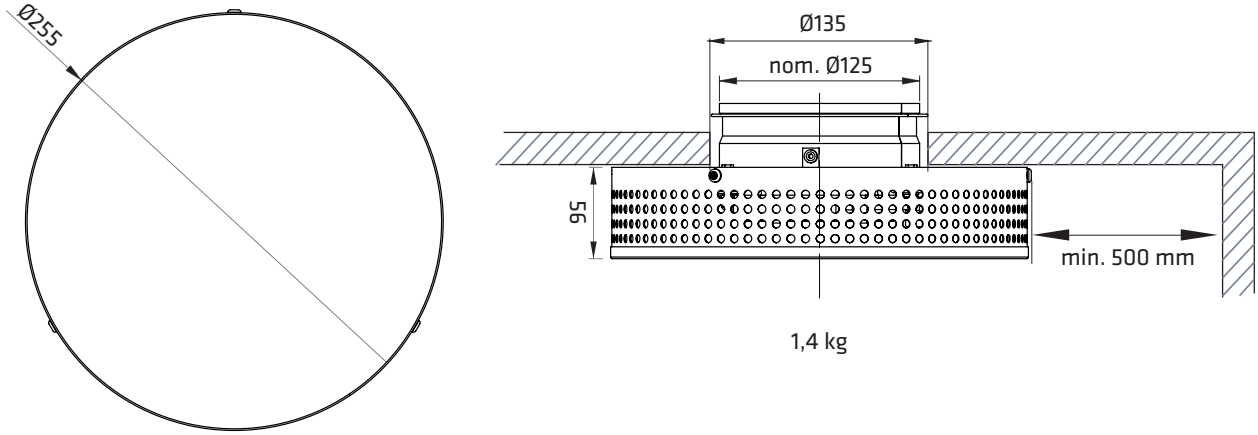
1,2 kg

ECO 2



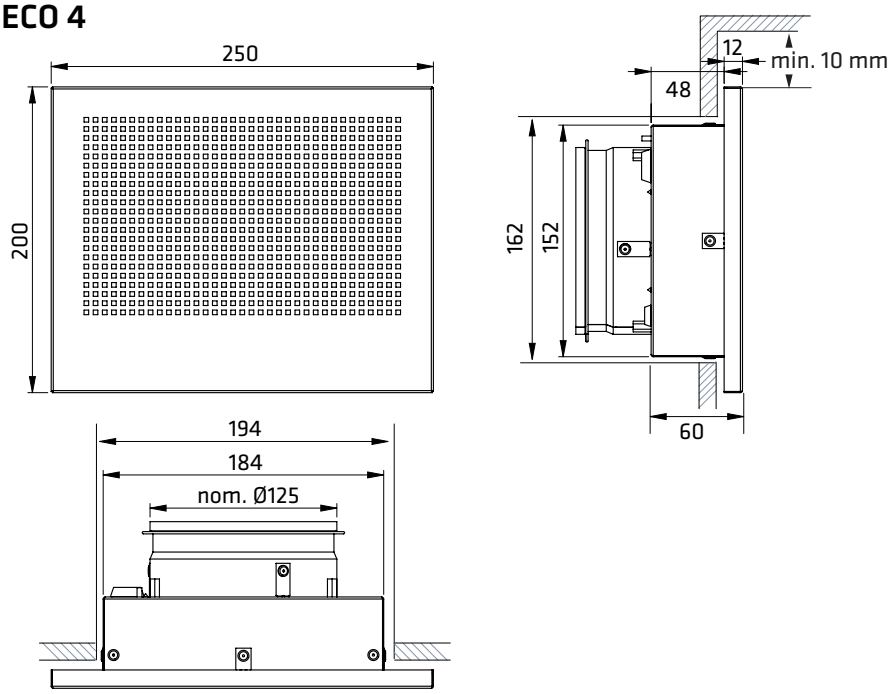
1,4 kg

ECO 3

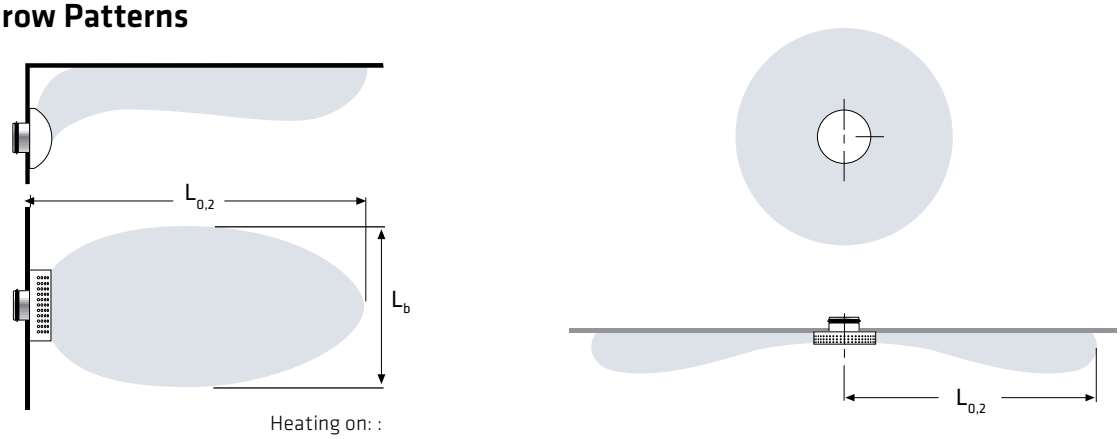


1,4 kg

ECO 4



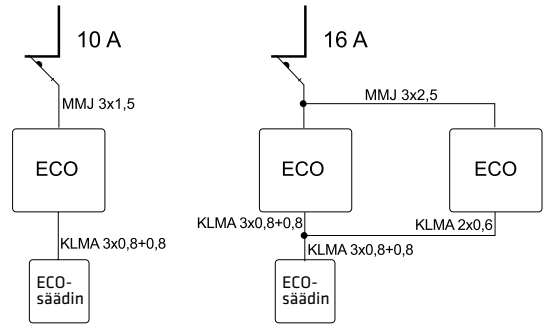
Throw Patterns



ECO1 Lb = 0,5 x L0,2	Heating on: : ECO1 Lb = 0,7 x L0,2
ECO2 Lb = 0,4 x L0,2	ECO2 Lb = 0,6 x L0,2
ECO4 Lb = 0,4 x L0,2	ECO4 Lb = 0,6 x L0,2

Connection

Examples of the connection cables



ECO product alternatives

Code	Description
ECOxT	Forced-air heater + control unit
ECOx	Forced-air heater
ECOT	Control unit

Technical specifications

Technical specifications of forced-air heater

Voltage	230V / 50 Hz
Power max	300–400 W (8–15 dm³/s)
Circuit breaker	10 A for one forced-air heater 16 A for two forced-air heaters
Duct size	Ø125 mm

Technical specifications of control unit

Voltage	24 Vac (20–26 Vac) Accuracy ± 0,5°C
Connectors	1.5 mm Enclosure class IP20, surface mounted
Factory setting	Adjustment range centre 21°C, adjustment range 18–24°C

Excellent heating with small air flows

In a passive house, the air permeability of the building's envelope must be below 0.6 1/h. This avoids draught problems and heavily layered temperatures, both typical in old houses.

Forced-air heating in a passive house will work perfectly. With ECO forced-air heaters, you can achieve a good indoor climate with an air volume of 6 - 8 dm^3/s/person with a total outdoor air flow of at least 0.35 $dm^3/s/m^2$. On hot summer days, an accelerated outdoor air flow is used for cooling if necessary.

A suitable heating method for wet rooms with tiled surfaces in passive houses is low-power floor heating, which will also accelerate the drying of the floor surfaces. Floor temperature should exceed room temperature by only 2–4°C.

Only the right product guarantees functionality

The devices for forced-air heating must be specially designed for their purpose. The pressure difference must be sufficient, not less than 20 Pa, to achieve the best mixing ratio and thermal comfort. As the heated supply air is blown from the top of the walls or from the ceiling toward windows, there will be no temperature layers or a feeling of draught. Window constructions should be designed specifically for passive houses.

Forced-air heating in individual rooms brings many benefits

+ Temperatures adjustable individually in each room
+ Minimised heat losses in air ducts
+ Reliability of a decentralised system
+ Quick response to heat load changes in rooms

These factors have a direct effect on the energy consumption and temperature control of your house. As a result, you will get increased thermal comfort and a good, safe indoor climate.

Temperature setback switch for even better energy efficiency

You can optimise your energy consumption even more by using the stepless temperature drop function available for the ECO heating system. When you leave the house, you can lower the room temperature by 3–10°C from the preset value.

The function is activated through potential free contact information from your home automation system, or simply by a manual switch installed next to the front door.

Easy maintenance—only cleaning required

Your heating system should be easy to maintain and clean. The ECO series products can be easily opened for cleaning both the device itself and the air ducts. That is all the maintenance the system will require.

One to three devices per room

For smaller rooms, such as bedrooms, one ECO forced-air heater is usually enough. Two or three heaters are usually installed in larger rooms, such as living rooms. Even if the room has two or three devices, control is still performed using only one ECO series control unit.

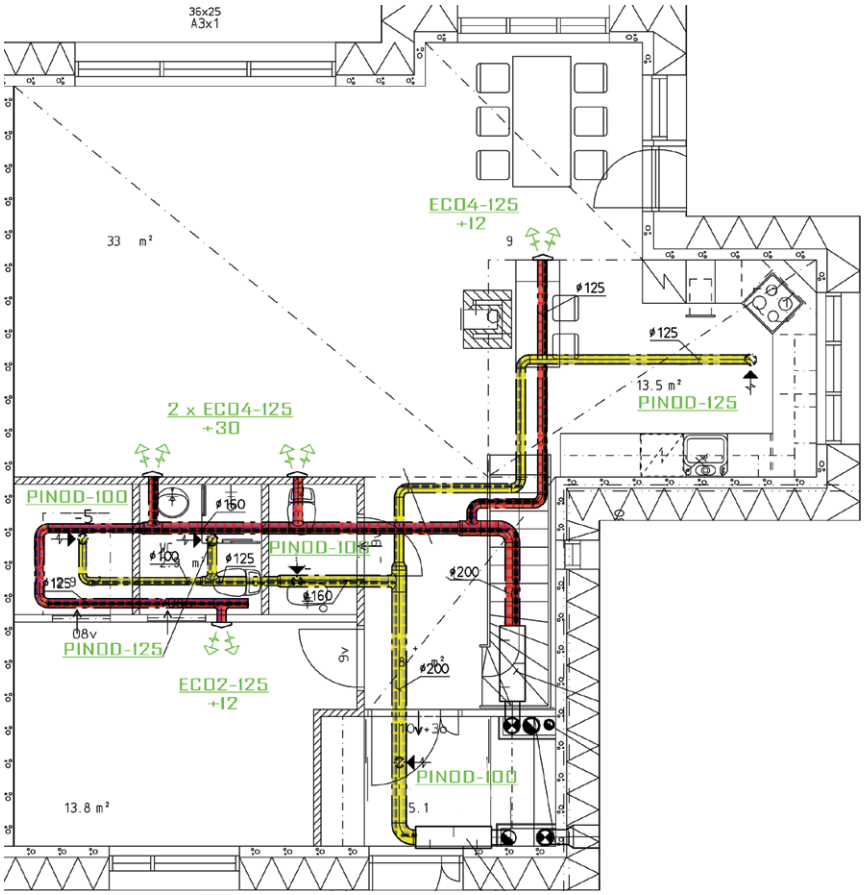
In a normal heating environment, the power of an ECO forced-air heater is 30–400 W, depending on your heating requirements. The starting current spike of the self-limiting ceramic heater core element should be taken into account when dimensioning the system.

The excellent air and sound performance of the ECO series, as well as its advanced PI control method and high-quality components provide an energy-efficient, silent, comfortable and safe indoor climate in a passive house.

CE
FI

Climecon's ECO products, made in Finland, are tested by the Technical Research Centre of Finland*). Electrical safety is guaranteed through approval by SGS Fimko and the FI sign.

Installation example of ECO forced-air heaters



Installation example for a passive house
Two to three ECO forced-air heaters are installed in large spaces, all controlled by one ECOT control unit. One ECO forced-air heater is sufficient for smaller rooms.